

# (12) UK Patent Application (19) GB (11) 2 309 483 (13) A

(43) Date of A Publication 30.07.1997

(21) Application No 9700253.9

(22) Date of Filing 08.01.1997

(30) Priority Data

(31) 9600325  
9616915

(32) 08.01.1996  
12.08.1996

(33) GB

(51) INT CL<sup>6</sup>  
A62B 35/00

(52) UK CL (Edition O )  
E2A AAN A106 A120 A184 A400  
U1S S1142

(56) Documents Cited  
GB 1503493 A GB 1351447 A GB 1275571 A  
GB 1201853 A GB 1122920 A US 3606456 A

(58) Field of Search  
UK CL (Edition O ) E2A AAN AAS ACAK ACAL ACAM  
INT CL<sup>6</sup> A44B 11/20 , A62B 35/00  
ONLINE-EDOC

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## (54) Buckle arrangement

(57) A buckle mounting arrangement for rear seats in automobiles comprising a buckle head 2 with an opening for receiving the cooperating tongue 5 and means 8 for orienting the buckle head in a predetermined direction and orientation so as to facilitate insertion of the tongue. Preferably the buckle head is resiliently biased to a general vertical orientation with the opening lying generally longitudinally of the vehicle so as to be parallel to the tongue in normal use. The biasing may be by helical spring 11 wound around a support bar attached to a mounting member. The buckle head may be attached to the support bar which in turn is bolted to the vehicle chassis. Alternatively it may be mounted on a ball joint, Figs 3-6 (not shown) attached to a mounting plate (15) or by a length of seat belt webbing. Two rear seat buckles may be jointed by a double, preferably stitched layer of webbing which is rivetted or bolted to a mounting bracket.

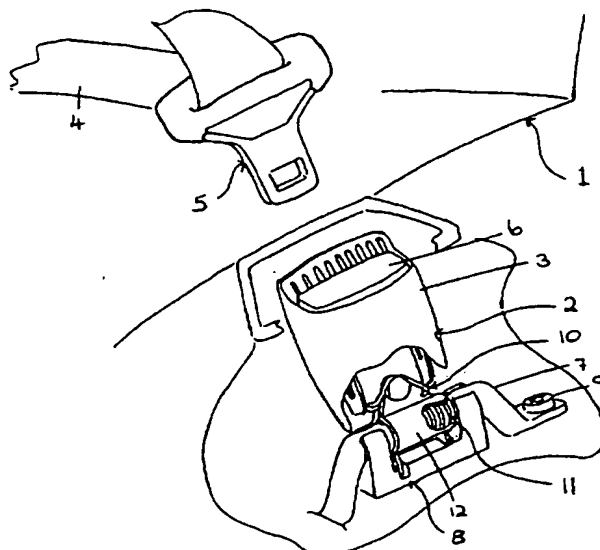


Fig 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

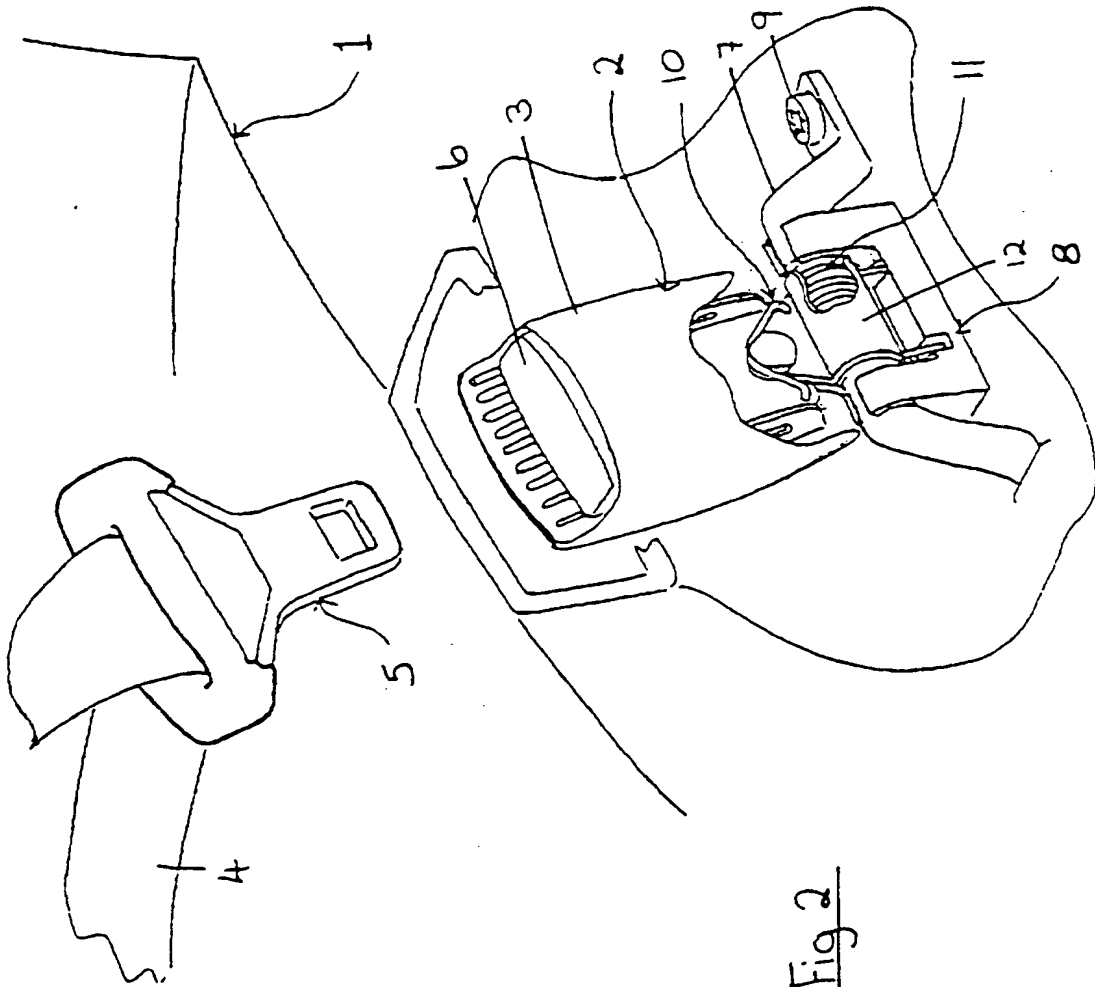


Fig 1

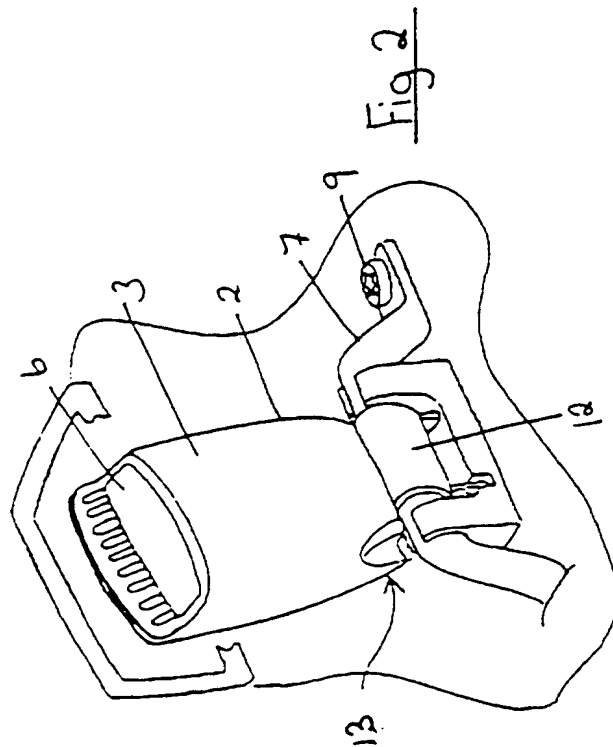


Fig 2

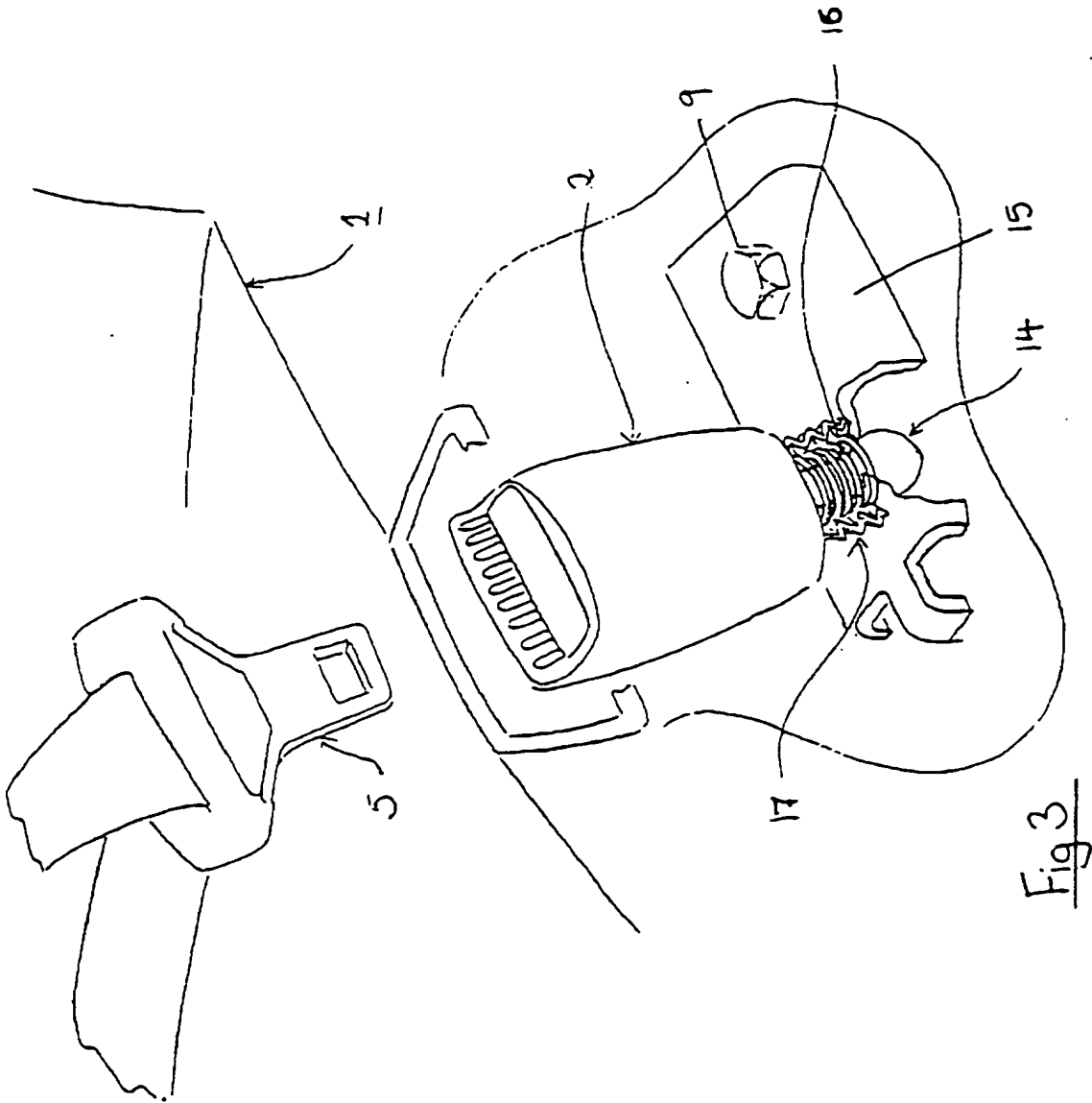


Fig 3

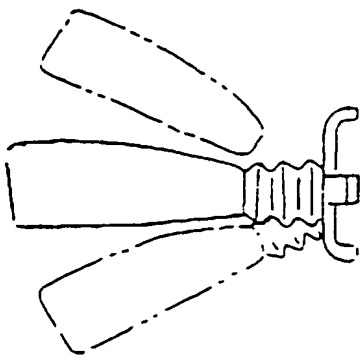


Fig 4a

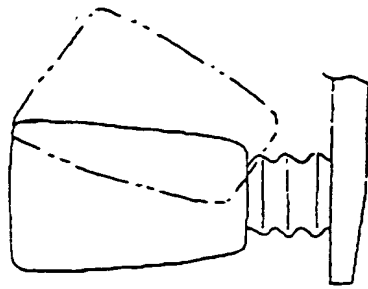
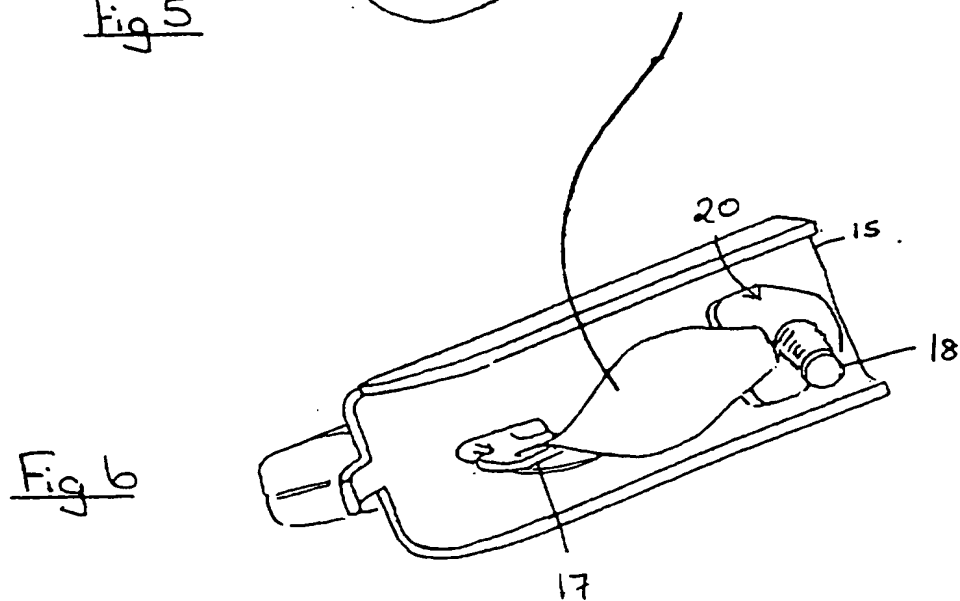
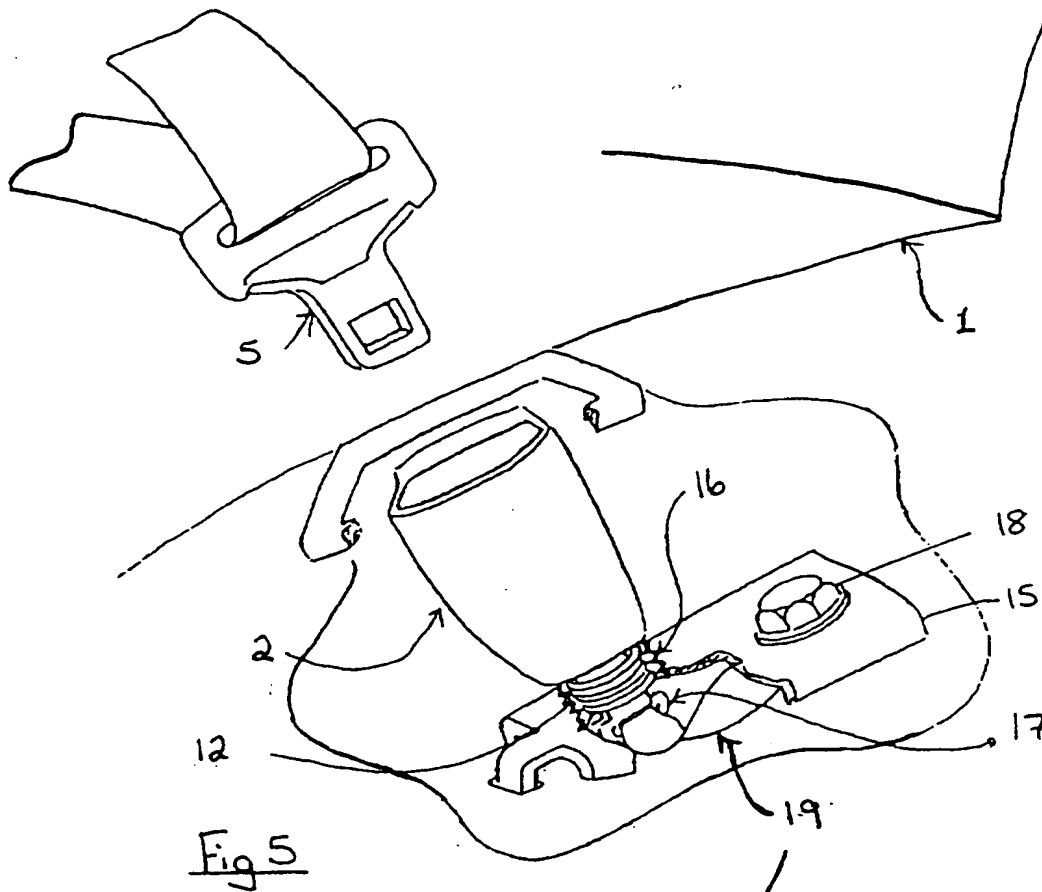
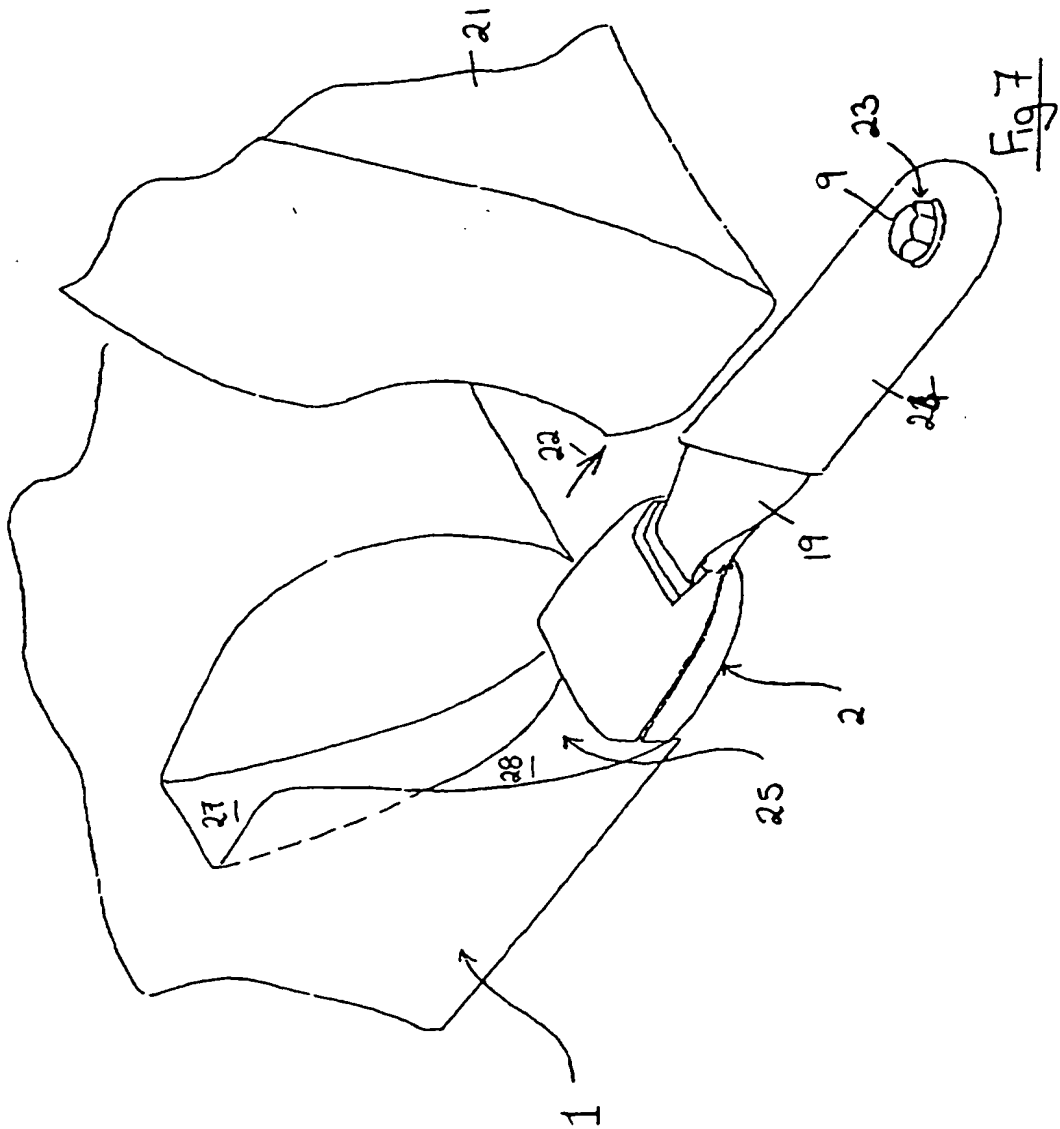
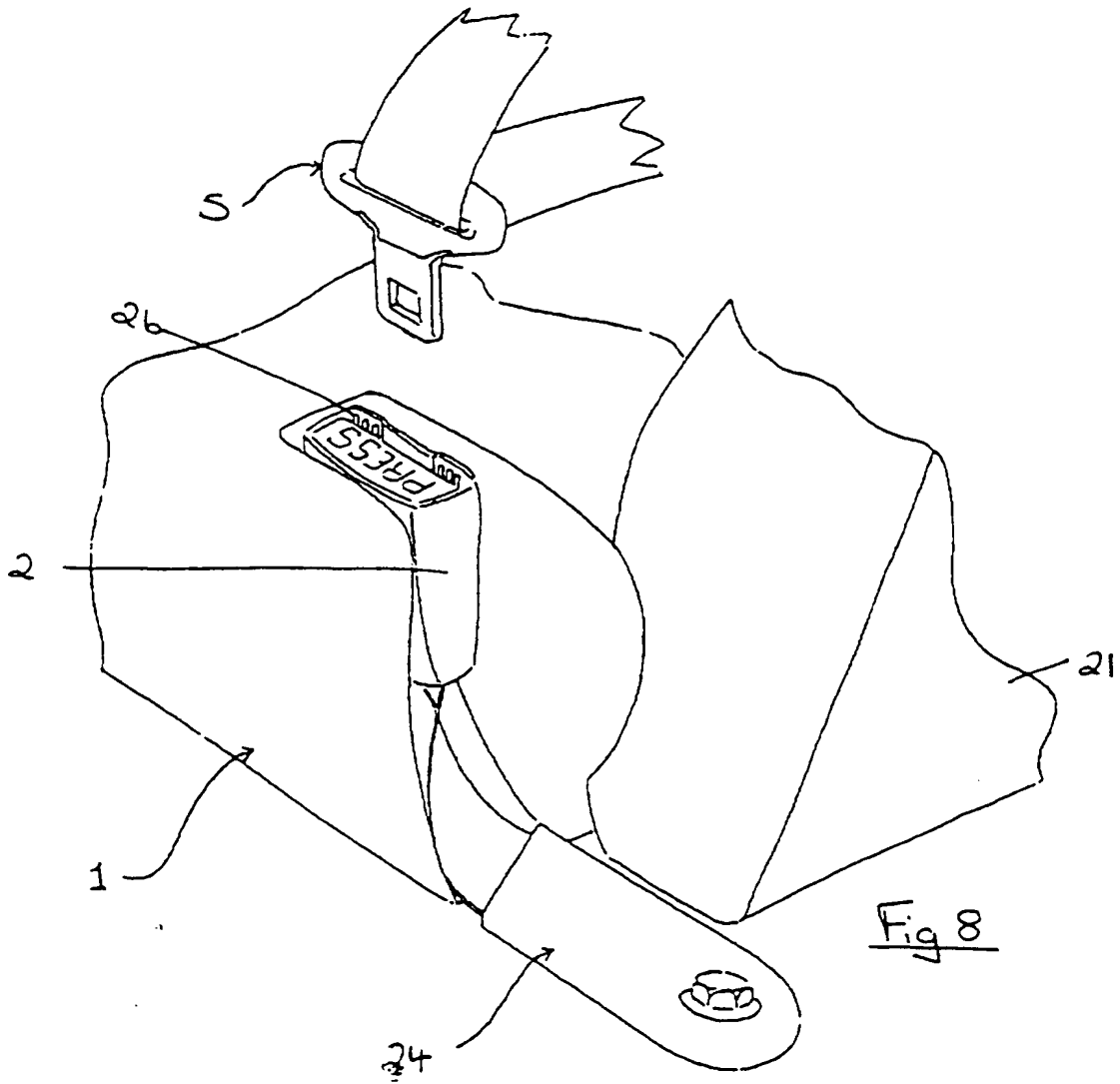
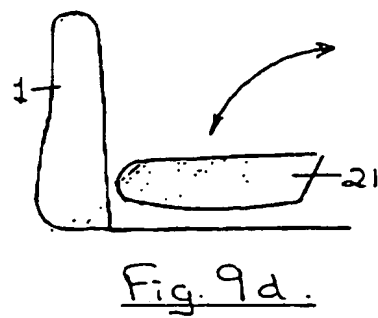
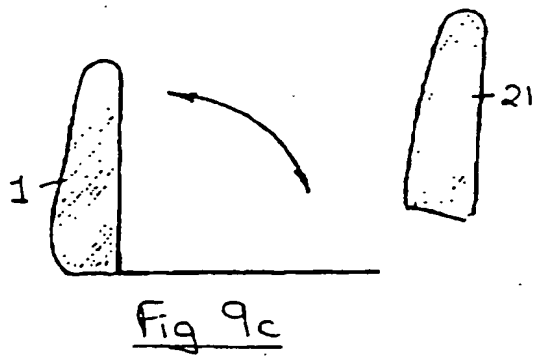
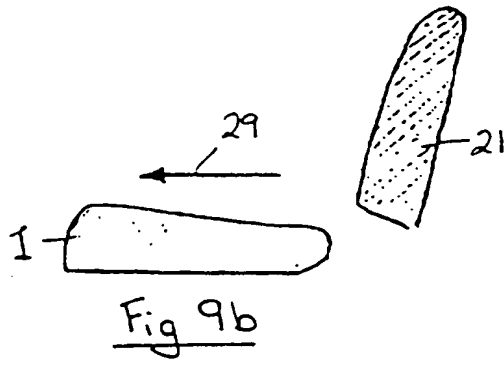
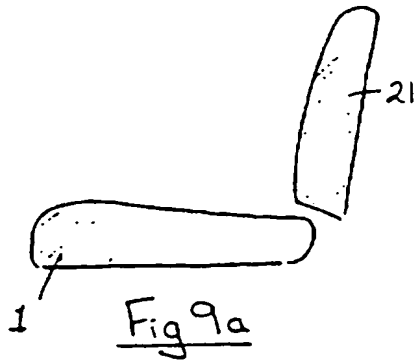


Fig 4b









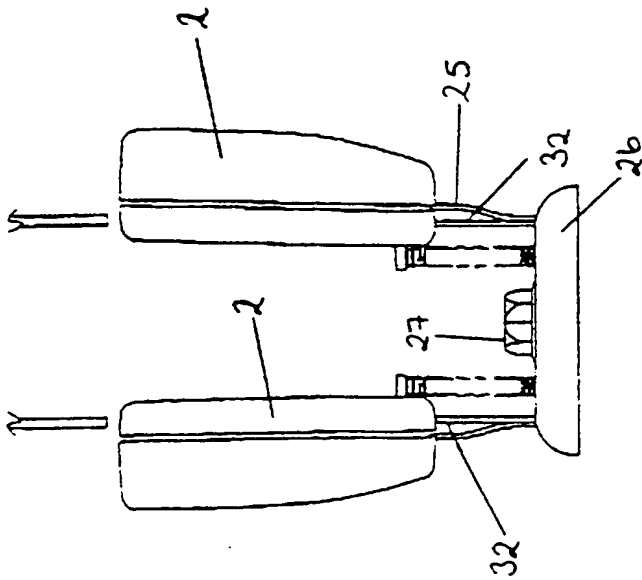


FIGURE 10

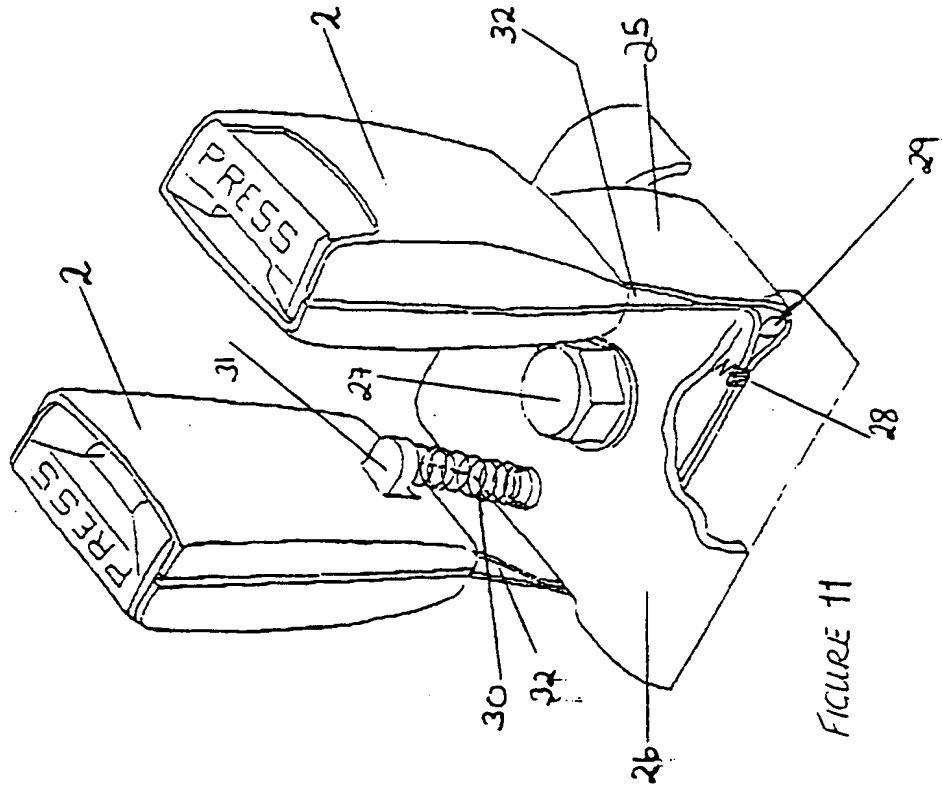


FIGURE 11



BUCKLE ARRANGEMENTDESCRIPTION

The present invention relates to a buckle arrangement and more particularly to an arrangement for use with  
5 automobile buckles for rear passenger seats, and to a mounting arrangement therefor.

A problem arises in such arrangements in accommodating  
buckles for the rear safety restraints. To provide the  
10 required security and strength when restraining an occupant,  
rear safety restraint buckles must be attached to fixed  
parts of a vehicle rather than to elements of the seat.  
Rear seat buckles are thus usually attached to the vehicle  
support structure underneath the seat cushion or squab in  
15 the central region thereof. The buckles then lie on seat  
squabs and a rear passenger must pick up the buckle head to  
correctly orient it to insert into it the engaging tongue on  
the end of the cooperating belt. This is obviously  
undesirable from a convenience point of view. Also, the  
20 buckles tend to slip down between the seat cushions.

In many modern automobiles the rear seat can be folded  
so as to expand the rear area available for storage in the  
car. This is particularly so of so-called hatchback cars.  
25 It is usually effected by pivoting the base part of the rear  
seat, otherwise known as the squab, into a vertical position  
and folding the back seat support downwardly in a forward  
direction so that it adopts a horizontal position.

30 When the rear seat is reinstated and the seat base  
cushion is folded back into a horizontal position, the

buckles tend to be hidden beneath the seat cushion and manual intervention is required to locate them and reposition them in the gap between the squab and the back support.

5

In some automobiles, the rear seat squab is in two parts to enable, for example, one half to be folded to provide extra storage while still retaining a single rear passenger seat. In this case, the buckles are often located  
10 between the seat cushions but the same problem arises when folding the seat cushions back into the seating position.

Prior known rear seat buckle arrangements also tend to sit undesirably high above the seat, making the seat  
15 uncomfortable for a third passenger.

The present invention aims to provide an arrangement which obviates these disadvantages by causing a buckle head to be automatically located in a convenient position and  
20 orientation and which automatically tends to present itself with its tongue receiving opening facing in the tongue insert direction when the seat squab is in or returns to a horizontal position. A further object is to provide a shorter rear seat buckle head mounting assembly.

25

According to the present invention there is provided an arrangement comprising a safety restraint buckle head having an opening formed therein for receipt of a cooperating safety restraint engaging member, means for securing the  
30 buckle head to a fixed part of a vehicle, and means for orienting the buckle head opening in a substantially

predetermined direction and orientation to present the buckle head in a generally upward direction and in an orientation substantially parallel to that of the cooperating member in normal use so as to facilitate  
5 insertion of the cooperating engaging member.

The most convenient orientation for a vehicle occupant who is engaged in fastening his safety restraint is for the opening to be generally parallel to the side of the vehicle  
10 and to be facing upwardly and slightly forwardly.

According to one embodiment, the buckle head is mounted on a support block attached to a fixed part of the vehicle and spring tensioning means are provided between the buckle  
15 head and the support block so that the buckle head is resiliently retained in a generally vertical orientation.

The spring tensioning may be effected by a helical return spring wound around a support bar which forms an  
20 intermediate member between the buckle head and the support block. Additionally a spring clip may be used to provide further resilient biasing force.

In an alternative embodiment the buckle is supported on  
25 the support block via a ball joint and is tensioned in a vertical direction by a compression spring acting between the buckle head and the support block. Preferably the spring is covered by a shroud, which may be of plastic or of fabric, for protection from dust, dirt and any loose items  
30 in the vehicle.

Instead of a ball joint the buckle head may be supported on a rigid stalk which passes through an aperture in the support block and which is connected to the support block by a flexible webbing. Of course many different ways of incorporating a suitable resilient bias whilst allowing adequate lateral movement of the buckle for adjustment to different occupant sizes and shapes, and ensuring a strong connection to the vehicle, could be used and will be evident to a person skilled in this field without further inventive input.

In some vehicles the rear passenger seat must be moved forwardly a small distance before it can be rotated into a vertical position. Likewise on return it is rotated into a horizontal position and then pushed rearwardly for a small distance to engage with the seat back. In vehicles using this arrangement, one embodiment of the present invention provides for a guide channel to be cut or moulded or otherwise defined or formed in a seat squab. This guide channel preferably has a profile providing a guide path for the buckle head, which rises in a curve from the bottom rear edge of the seat squab to the top a short distance forward of the rear edges. Thus, as the seat cushion or squab is moved rearwardly, the buckle head rides up the channel and is thus turned from a horizontal position when it is lying on the seat support beneath the seat squab, into a generally vertical position as the seat squab is pushed fully into position. The buckle head thus presents an opening for the cooperating part of the safety restraint, ie for the safety belt tongue, which is automatically located in a convenient position for the passenger.

According to a preferred embodiment of this aspect of the invention, the profiled channel has a tapering width as it rises through the seat squab so that as the buckle head rises it is turned through approximately 90 degrees, to align the opening for the tongue, not only vertically but also in a plane lying generally front to back of the vehicle. This is the most convenient orientation for the buckle head opening for insertion of a safety restraint tongue and also for operation of the buckle release button.

10

In this embodiment the buckle is flexibly connected to the vehicle chassis by means of a flexible fabric, such as seat belt webbing, fastened with a bolt.

15 In another preferred embodiment the buckle head is resiliently biased to an upright position, preferably by a compression spring and the buckle is fastened securely to a part fixed to the vehicle by a length of flexible seat belt webbing, preferably two layers. The webbing may be bolted  
20 to a mounting bracket comprising a metal plate with side flanges to provide a hollow gap below the plate. The webbing passes through a slit in the plate or a recess in the side and is bolted or screwed to the bracket. The double webbing may be stitched across the width of the  
25 webbing, in two or more generally parallel lines or zig-zag or other pattern. A pin of metal or other suitable strong material may be positioned across the width of the webbing in the vicinity of the stitches, to resist twisting of the webbing.

30

Two buckles may be connected to the same mounting

plate, and joined at opposite ends of the same length of single or double webbing. This has the advantage that stitch patterns are hidden beneath the mounting bracket and the overall height of the buckle head from the floor pan is thus not limited by the provision of stitch patterns nor by the sill end bracket.

For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made to the accompanying drawings in which:

Figure 1 is a schematic, part cut-away side view of a buckle head embodying a first embodiment of the arrangement of the present invention;

15

Figure 2 illustrates a particular feature of the embodiment of Figure 1;

Figure 3 is a schematic part cut-away side view of a second embodiment of an arrangement according to the invention;

20

Figures 4a and 4b schematically illustrate the movement possible using the embodiment of Figure 3;

25

Figure 5 is a schematic part cut-away side view of a third embodiment of the invention;

Figure 6 is an underside view of Figure 5;

30

Figures 7 and 8 are perspective views of a fourth

embodiment of the invention;

Figure 9 is a schematic illustration of how a seat incorporating the buckle arrangement of the fourth  
5 embodiment, may be folded.

Figure 10 illustrates in perspective part cut-away form a mounting arrangement for buckle heads according to a fifth embodiment of the invention; and  
10

Figure 11 illustrates the mounting arrangement of Figure 10 in side view.

Figure 1 shows a part cut away view of a first  
15 embodiment of the invention. The edge of a seat base cushion or squab is indicated in outline at 1.

A buckle head 2 is shown adjacent the seat cushion 1 with a part cut away cover 3. A seat belt webbing 4 is  
20 connected to a belt tongue 5. The belt tongue is insertable into the opening at the top of the belt buckle and release button 6 is operable to disengage the tongue from the buckle head.

25 The buckle head 2 is fixed via support rod 7 and support block 8 to an immovable part of the vehicle such as some part fixed to the chassis, by bolt 9.

Two return springs 10 and 11 are used to provide a bias  
30 to the buckle head to keep it in a generally upright orientation with the opening in the buckle head presented

towards and in line with the tongue 5 so that the tongue may be easily inserted into the buckle by an occupant of the seat 1.

5       The spring 11 is covered by a protective shroud 12 (shown part cut away in Figure 1).

Figure 2 illustrates the buckle and supports as shown in Figure 1 but with the buckle head cover 3 and the spring  
10 cover 12 intact. However buckle head cover 3 is shown specially shaped to prevent fouling on the slider bar. This shaping is indicated at 13.

Figure 3 shows another embodiment of the invention in  
15 part cut away view. A buckle head 2 is supported on a shaft which ends in a ball joint 14. The shaft passes through a support plate 15 which is bolted to the chassis or other immovable part of the vehicle by bolt 9.

20       The ball joint arranged in this way allows free movement of the buckle head and some possibilities are shown in Figure 4a (lateral movement) and 4b (forward/rearward movement). Around the shaft is wound a coil spring 16 which tensions the buckle head in a generally vertical direction  
25 away from the support plate 15. This tension acts against the gravity of the buckle head 2 to maintain the buckle head in a upright generally vertical position presenting its opening towards the tongue 5.

30       The coil spring 16 is covered by a shroud 17 of a standard concertina-type profile which may be of plastics



material or of leather or of fabric depending upon the requirements of matching the internal decor of a vehicle.

Figure 5 illustrates a further alternative embodiment of the invention. Again a coil spring is used and is wound around the shaft from the buckle head. However, the shaft terminates at a ring 17 below a support plate 15. Through the ring 17 passes webbing fabric 19 which is fastened to the support plate by nut 18 and washer plate 20.

10

Coil spring 16 again tensions buckle head 2 against support plate 15 and is protected by shroud 12.

Figure 6 illustrates the underside of support plate 15 and like parts are referenced accordingly.

An alternative embodiment is shown in Figures 7 and 8.

Figure 7 illustrates seat squab 1, i.e. the base cushion, and seat back 21 as the seat squab is being restored to the stowed position in which a vehicle occupant can use it as a seat. To this effect the seat squab 1 is being moved in the direction of arrow 22 so as to bring it up against seat back 21. The belt buckle 1 is lying on the seat support in a generally horizontal position. The buckle head 2 is flexibly connected to anchorage point 23 by webbing 19 which is covered in a plastic protective shroud 24. Anchorage point 23 comprises a bolt 9 connected to the chassis or immovable part of the vehicle.

30

A seat squab 1 contains a cut out profiled scoop or

channel 25.

Figure 8 illustrates the same components when the seat squab 1 is moved fully up against seat back 21 in the stowed position. In this position, the buckle head 2 has caught in the channel 25 and been directed into a generally upright orientation with the buckle opening 26 presented to tongue 5 in the most suitable and convenient orientation for a vehicle occupant to fasten his or her seat belt.

10

To facilitate this guiding of the buckle head, the profiled scoop or channel 25 is specially shaped, for example tapered, towards its upper edges. It may be formed by appropriately moulding the seat, by cutting out from the body of the seat or by inserting specially shaped plastics panels. Preferably the shape of the channel is such that it comprises a flat rearward part 27 and a twisted side part 28. The twisted side part guides the outer (near side in Figures 7 and 8) part of the buckle head and causes it to twist into the position shown in Figure 8.

Figures 9a to 9d illustrate schematically and in cross-section one way of arranging a rear passenger seat so as to make more rear storage space. Figure 9a illustrates the seat squab 1 in a horizontal position and the seat back 21 in a generally vertical position in the normal stowed orientation for accommodating a passenger. Figure 9b shows the seat squab 1 having been moved forward in the direction of arrow 29 away from seat back 21. The seat squab 1 is then rotated through 90° into an upright position as shown in Figure 9c and subsequently the seat back 21 is rotated

into a horizontal position as shown in Figure 9d.

In the embodiment of Figures 10 and 11 two buckle heads 2 are connected together via doubled webbing 25. The webbing 25 passes under mounting bracket 26 and is fixed thereto, and to a fixed part of the vehicle by bolt 27.

The webbing 25 is stitched at 28, transversely, either in straight lines or using a zig-zag stitch as shown or in any other stitch pattern. This improves the strength of the connection between the buckle heads. A webbing pin 29 extends across the width of the webbing to prevent twisting or puckering of the webbing. This may suitably be of 8.0mm diameter but the actual value chosen will depend on the geometry of the buckles, mounting plates and webbing. This is shown in the cut-away portion of Figure 11 for one buckle head but applies equally to both buckle heads.

A compression return spring 30 is attached between the upper surface of the mounting bracket 26 and a side flange spring holder 31 on the buckle head. This spring biases the buckle heads 2 to upright position for an easier insertion of the engaging tongue. Such a return spring is provided for both buckle heads.

The arrangement causes a gap between the two webbing fabric bonds as shown at 32.

With this arrangement the buckle head can pivot 180° in any direction and yet still conveniently presents the tongue receiving slot upwards for easy tongue insertion. The

return spring ensures that the buckle head returns to the position shown in the Figures.

5 This flexing buckle assembly can be constructed more compactly than was hitherto possible, i.e. shorter and closer to the seat itself, possibly as short as 25mm. In previous designs the height was governed by the sill end bracket and had to allow extra webbing space for stitch patterns.

10

CLAIMS

1. An arrangement comprising a safety restraint buckle head having an opening formed therein for receipt of  
5 a cooperating safety restraint engaging member, means for securing the buckle head to a fixed part of a vehicle, and means for orienting the buckle head opening in a substantially predetermined direction and orientation to present the buckle head in a generally upward direction and  
10 in an orientation substantially parallel to that of the cooperating member in normal use so as to facilitate insertion of the cooperating engaging member.

2. An arrangement according to claim 1 wherein the  
15 orienting means comprises means to resiliently bias the buckle head to an orientation in which the buckle tongue engaging opening is facing generally upwardly in the vehicle.

20 3. An arrangement according to claim 1 or claim 2 wherein the orienting means comprises means to resiliently bias the buckle head to an orientation in which the buckle tongue engaging opening lies in a plane generally parallel to the longitudinal axis of the vehicle.

25

4. An arrangement according to any preceding claim wherein the buckle head is mounted on a support block which is attached to a fixed part of the vehicle.

30 5. An arrangement according to claim 4, wherein the resilient biasing means comprises spring tensioning means

between the buckle head and the support block so that the buckle head is resiliently retained in a generally vertical orientation.

5           6.    An arrangement according to claim 5 wherein the spring tensioning means comprises a helical return spring wound around a support bar which forms an intermediate member between the buckle head and the support block.

10           7.    An arrangement according to claim 6, wherein the spring tensioning means further comprises a spring clip arranged to act between the buckle head and the support bar.

            8.    An arrangement according to claim 4, wherein the  
15 buckle is supported on the support block via a ball joint and is tensioned in a vertical direction by a compression spring acting between the buckle head and the support block.

            9.    An arrangement according to claim 8, wherein the  
20 spring is covered by a shroud for protection from dust, dirt and any loose items in the vehicle.

            10.   An arrangement according to claim 9, wherein the  
shroud is formed of plastic.

25

            11.   An arrangement according to claim 9, wherein the shroud is formed of fabric.

            12.   An arrangement according to any one of claims 4 to  
30 7, wherein the buckle head is supported on a rigid stalk which passes through an aperture in the support block and

wherein the buckle head is connected to the support block by a length of flexible webbing fabric to allow for lateral movement of the buckle head for adjustment to different occupant sizes.

5

13. An arrangement according to claim 1 for use in rear passenger seats with translational movement, comprising a buckle head fastened to the vehicle by a flexible connection, and comprising a movable seat squab having a  
10 guide channel providing a guide path for the buckle head, which guide path rises in a curve from the bottom rear edge of the seat squab to the top of the seat squab, a short distance forward of the rear edges, so as to raise the buckle head opening into a vertically facing position as the  
15 seat squab is moved.

14. An arrangement according to claim 13 wherein the channel has a tapering width as it rises through the seat squab so as to turn the buckle head through 90° as it rises  
20 and to align it such that the opening lies in a plane generally parallel to the longitudinal axis of the vehicle.

15. An arrangement according to any preceding claim comprising two buckle heads connected together by a length  
25 of flexible material which is fixed to and passes underneath a mounting bracket, which mounting bracket is attached to a fixed part of the vehicle.

16. An arrangement according to claim 15 wherein each  
30 of the two buckle heads is resiliently biased away from the mounting plate.

17. An arrangement according to claim 15 to 16 wherein the two buckle heads are connected together by two lengths of flexible seat belt webbing arranged as a double layer.

5 18. An arrangement according to claim 17, wherein the two lengths of the double layer are stitched together transversely across the width of the webbing.

19. An arrangement according to claim 17 or 18  
10 comprising a cylindrical pin located between the two lengths of the double layer and extending transversely across the width of the webbing.

20. An arrangement substantially as hereinbefore  
15 described with reference to Figures 1 and 2 or Figures 3, 4a and 4b, or Figures 5 and 6 or Figures 7, 8 and 9 or Figures 10 and 11 the accompanying drawings.





Application No: GB 9700253.9  
Claims searched: All

Examiner: A Angele  
Date of search: 7 April 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.O): E2A(ACAK, ACAL, ACAM, AAN, AAS)  
Int Cl (Ed.6): A62B-035/00; A44B-011/20  
Other: Online-EDOC

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 1503493 A KANGOL MAGNET Ltd.	1-5 at least
X	GB 1351447 A KANGOL MAGNET Ltd	1-6 at least
X	GB 1275571 A DYNASAFE EQUIPMENT Ltd (See especially embodiment of fig 6)	1-4 at least
X	GB 1201853 A WINGARD Ltd	1-4 at least
X	GB 1122920 A AB INDUSTRIFJÄDRAR	1-4 at least
A	US 3606456 A D C CAZABON	
	See whole document unless otherwise indicated.	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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